News focus

# Seeking balance in the GM crop debate

Genetically modified crops are finding economic and environmental favour in many countries but in Europe people remain deeply suspicious about them. A recent meeting in London aimed to encourage scientific debate. **Nigel Williams** reports.

There's a continuing gap between attitudes towards genetically modified (GM) crops in Europe and elsewhere. While the US, Canada, China, India and many other countries are adopting them with gusto, most European countries remain at best cautious and at worst completely hostile to their introduction.

The reasons for Europe's apparent Luddism are many and complex. In some countries there is a general abhorrence of any genetic manipulation. There is also a distrust of the food industry and official regulators, following numerous scares from salmonella, through Escherichia coli, to bovine spongiform encephalopathy (BSE or mad cow disease). Opponents argue that, although consumers may be taking risks by eating genetically modified food, all of the benefits go into the pockets of biotech companies. And there are genuine differences between farming practices in the US and Europe, where many farms are still relatively small and wildlife is dependent on particular farming techniques that critics fear will be changed by the new crops.

Britain's science academy, the Royal Society, held an open meeting last month to try to tackle these issues and present the scientific assessment of GM crops. To open, the meeting highlighted just how much change had resulted from increasingly intensive but conventional agriculture in Europe. For example, changes from spring to autumn-sown cereals has had a major impact on many species, especially birds. Eschewing ideological and theoretical arguments, the meeting focused on the practical issues surrounding the potential benefits and risks of GM crops.

The vehemence of opposition to GM crops is surprising in the view of Europe's willingness to embrace biotechnology for medical and other uses. There has, for example, been little ethical concern about the introduction of

**Fields of contention**: trials are still under way in Europe on the potential impact of several genetically modified crops including oilseed rape, shown above. But in other parts of the world such crops are in full-scale production and appear to be delivering both economic and environmental advantages over conventional crop varieties. (Picture: Science Photo Library.)

genetically engineered insulin for treating diabetes, or a genetically engineered version of the enzyme chymosin for cheesemaking. Ironically, because chymosin is traditionally extracted from calves' stomachs, the innovation has made cheese more acceptable for many vegetarians. "Because these cheeses contain no GM ingredients, and therefore are not usually labeled as GM, few people appear to appreciate how much their production depends on GM technology," says Lord May, president of the Royal society.

"The public should be allowed to hear about the potential benefits of GM crops, as well as the possible risks," says May. "Much of the debate so far has been skewed towards the risks and many people may have gained the mistaken impression that GM offers little or no advantage." He believes that this has been partly because those who are ideologically opposed to GM have run a very effective campaign, partly because those who are developing applications of GM technology have not perhaps engaged the public as much as they might have, and partly because stories about the risks of a new technology sell more newspapers than stories about its benefits.

"We are now beginning to hear more about the potential benefits of applying GM technology to the production of crops. There have been recent scientific papers about the possible benefits to wildlife of growing GM sugar beet, and earlier this year researchers reported that GM cotton in India could deliver spectacular increases in yield and cuts in pesticide use. More work is needed to explore these and other possible benefits," he argues. "But further research also needs to be carried out into the potential risks that may be associated with GM crops. Much of this work will need to focus on the impact on the diversity of plant and animal life, and assessed against the problems associated with the intensification of agricultural practices," he says.

The meeting heard about some results of studies on GM oil-seed rape now widely grown by Canadian farmers. Around 85% of of the crop is now herbicide-resistant GM varieties, said Linda Hall, of the University of Alberta. Studies suggest that farmers using the new varieties benefitted on average by $14.32 per hectare, herbicide use was reduced by 6,000 tons and 32 million litres of fuel needed for conventional crop spraying were saved.

Concerns about the potential invasiveness of GM crop varieties were also allayed, although non-native species can wreak havoc. Britain has three species from Eastern Asia introduced as garden plants that present a huge environmental and economic challenge. Rhododendrons in some parts of western Britain have invaded and overtaken native ecosystems; Japanese knotweed and buddleia have thrived in urban, semi-disturbed habitats causing major structural problems. But, says Mike Crawley, of Imperial College London, these species do not present a good model for looking at transgenic crops. "Most major crop species are annuals and are unable to survive long in uncultivated ground," he says. "Field trials have shown that it is important to study different GM crops at different sites and under different conditions to determine the risks and benefits," he said.

"We are now entering a new phase of the debate, focusing on specific applications of GM technology and weighing up the potential risks and benefits in each case. In some instances the risks will be judged to be unacceptable," says May.

"In other cases, the risks associated with GM technology will be judged to be non-existent or negligibly small and outweighed by the likely benefits, such as with GM vegetarian cheeses. As a result, those who are only interested in portraying GM technology as either inherently dangerous or entirely problem-free will be left on the margins, alone with their ideologies and vested interests, whilst everybody else engages in informed discussion about how we might use GM technology to create the kind of world we want."

One area remains implacably opposed to GMOs – organic agriculture. Demand for organic products has risen dramatically in recent years. In France, sales have increased by 25 per cent over recent years as BSE cases have been confirmed in that country. BSE is widely seen as a watershed. "For the first time people realised that merely attempting to ensure a culinary end product was safe to eat was not a good enough approach. We had to look at the entire process by which food is produced," says a spokesperson for Britain's Soil Association, which licenses organic growers. Both Sweden and Austria have more that 10 per cent of their agricultural land used for organic growing and the figure is rising in most countries.

Any assessment of GM crops increasingly needs to take such concerns on board. Again, the situation varies from crop to crop but it may be possible to segregate GM crops from organic plantings by sufficient distance to ensure any potential cross-pollination is negligible — particularly if labelling of GM products is enforced. Such prospects may present huge challenges but as Alan Gray, at the Centre for Ecology and Hydrology in Dorset. pointed out: "We are starting from scratch with this technology and isolation and separation is a real option." The main likely problem comes with the potential contamination of seed, he added.

But with the now clear potential for reductions in pesticide use and less disturbance to arable crop fields from spraying herbicide-resistant varieties, the meeting emphasised the need to assess practical risks and benefits of all aspects of potential GM technology for crop species.

"This is a golden age for plant science,' says Chris Lamb at the John Innes Centre in Norwich. Conventional breeding is 'scramble and sort' he said compared with the potential of 'cut and paste' with GM technology. The prospect of developing novel crops and fighting the continuing battle against plant pests and diseases is enormous, he said.